

2.3 Adding and Subtracting Monomials (Collecting Like Terms)

Goal(s) - Identify like and unlike terms

- Simplify and solve expressions by collecting like terms and use substitution for given variables

Page 66 #s 3, 4, 5, 6, 8, 10ace, 11bf, 12a,
14, 15bdf

Page 68 #s 16af, 20c, 24, 26c, 28

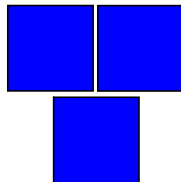
Like Terms

Terms that have **identical variables** and are raised to the **same exponent** are considered to be like terms.

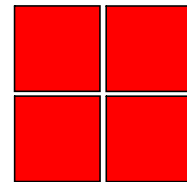
m^2



$-3m^2$



$4m^2$

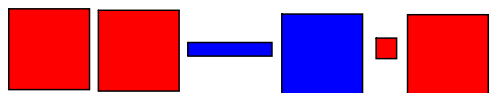


Red symbols \rightarrow POSITIVE

Blue symbols \rightarrow NEGATIVE

Think about temperatures on a thermometer

Identify the like terms in each grouping. Be prepared to explain why some terms are not like the others!



$2x, 2, 5x, 3xy, 3x$

$\Rightarrow 2x, 5x, 3x$ are like terms

$4a^2, 2a, a^3, a^2b, -a^2$

$\Rightarrow 4a^2, -a^2$ are like terms

$3u^2, -4uv, 2u^2, -5, \frac{1}{2}v$

$\Rightarrow 3u^2, 2u^2$ are like terms

As we have already seen, an **algebraic expression** is a collection of one or more terms involving variables, numbers, and operators.

The algebraic expression, $5m$, has **one term** (a **monomial**).

The expression, $6t + 7s$, has **two terms** (a **binomial**).

The expression, $6x^2 + 8x - 9$ has **three terms** (a **trinomial**).

Algebraic expressions can be **simplified** by **collecting** and **combining like terms**.

Simplify by collecting and combining like terms.

$$\underline{10x - 4x} + \underline{3 + 2}$$

$$10x - 4x = 6x$$

$$3 + 2 = 5$$

$$\Rightarrow 6x + 5$$

Simplify by collecting and combining like terms.

$$\underline{3x} + \underline{4} + \underline{5x} - \underline{6}$$

$$3x + 5x = 8x$$

$$4 - 6 = -2$$

$$\Rightarrow 8x - 2$$

Simplify by collecting and combining like terms.

$$\underline{6x} - (-5y) - \underline{2x} - 3y$$

$$6x - 2x = 4x$$

$$-(-5y) - 3y = 2y$$

$$\begin{array}{l} 0 - -5y \\ = 0 + 5y \\ = 5y \end{array} \quad \Rightarrow \quad 4x + 2y$$

Simplify by collecting and combining like terms.

$$\underline{-3x} + \underline{2} + \underline{6x} + \underline{(-8)}$$

$$-3x + 6x = 3x$$

$$2 + (-8) = -6$$

$$\Rightarrow 3x - 6$$

[could be written as $3x + (-6)$]

Simplify by collecting and combining like terms.

$$\underline{(-5x^2)} - \underline{(-7x)} + \underline{x^2} - \underline{3x}$$

$$-5x^2 + x^2 = -4x^2$$

$$-(-7x) - 3x = 4x$$

$$\Rightarrow -4x^2 + 4x$$

$$0 - (-7x) - 3x$$

$$= 0 + 7x - 3x$$

$$= 4x$$

Simplify by collecting and combining like terms.

$$\underline{\left(-\frac{1}{5}x\right)} + \underline{\frac{1}{3}y} + \underline{\frac{2}{5}x} + \underline{\frac{2}{3}y}$$

$$-\frac{1}{5}x + \frac{2}{5}x = \frac{1}{5}x$$

$$\frac{1}{3}y + \frac{2}{3}y = y$$

$$\frac{1}{3}y + \frac{2}{3}y \Rightarrow \frac{1}{5}x + y$$

$$= \frac{3}{3}y$$

$$= 1y = y$$

Simplify by collecting and combining like terms.

$$\frac{1}{6}x + 3 - \frac{2}{3} + \frac{5}{6}x$$

$$\frac{1}{6}x + \frac{5}{6}x = x$$

$$3 - \frac{2}{3} = 2\frac{1}{3}$$

$$\begin{aligned} &= \frac{3}{1} - \frac{2}{3} \\ &= \frac{9}{3} - \frac{2}{3} \\ &= \frac{7}{3} = 2\frac{1}{3} \end{aligned}$$